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APPLICANT(S) Xiaodong Huang, Andreas Stintz, Kevin Malloy, Guangtian Liu,
Luke Lester and Julian Cheng

PATENT NO.: 6,782,021 B2

ISSUE DATE: August 24, 2004

SERIAL NO.: 10/087,408

FILING DATE: March 1, 2002

TITLE: Quantum Dot Vertical Cavity Surface Emitting Laser

ATTY. DKT. NO.: 22920-06460

Certificate
OCT 05 2004
of Correction

CERTIFICATE OF MAILING

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Dated: SEPT. 27, 2004

By: Michael W. Farn

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ATTENTION: DECISION AND CERTIFICATE OF CORRECTION
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REQUEST FOR CERTIFICATE OF CORRECTION

SIR:

The following errors, as more fully described below, appear in this patent.

☒ The Applicant submits that no fee is due for correction of the errors made by the Patent and Trademark Office; OR,

☐ The errors occurred in good faith. Correction thereof does not involve such changes in the patent as would constitute new matter or would require re-examination. A

Certificate of Correction is requested. Enclosed herewith is payment in the amount of \$100.00 to cover the fee for this Certificate of Correction.

Attached hereto are duplicate Forms PTO-1050, with at least one copy that is suitable for printing.

Applicant kindly requests the following changes:

Title Page,

Item [56], **References Cited**, U.S. PATENT DOCUMENTS, add:

--	5,608,229 A	03/1997	Mukai et al.	257 /14
	5,781,575 A	07/1998	Nilsson	372 /50
	5,930,278 A	07/1999	Menigaux	372 /50 --

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Utzmeier, T. et al., "Growth and characterization of self-organized InSb quantum dots and quantum dashes," *Journal of Crystal Growth*, North-Holland Publishing Co., Amsterdam, The Netherlands, Vol. 175-176, May 1, 1997, pages 725-729.

PCT International Search Report, International Application No. PCT/US01/29561, June 6, 2003, 7 pages.

Bloch, J. et al., "Room-temperature 1.3 μm emission from InAs quantum dots grown by metal organic chemical vapor deposition," *Applied Physics Letters*, American Institute of Physics, New York, U.S., Vol. 75, No. 15, October 11, 1999, pages 2199-2201.

Evans, P.W. et al., "Edge-emitting quantum well heterostructure laser diodes with auxiliary native-oxide vertical cavity confinement," *Applied Physics Letters*, American Institute of Physics, New York, U.S., Vol. 67, No. 21, November 20, 1995, pages 3168-3170.

Garcia, J.M. et al., "Electronic states tuning of InAs self-assembled quantum dots," *Applied Physics Letters*, American Institute of Physics, New York, U.S., Vol. 72, No. 24, June 15, 1998, pages 3172-3174.

- Kim, Jin K. et al., "Lateral Carrier Confinement in Miniature Lasers Using Quantum Dots," *IEEE Journal of Selected Topics in Quantum Electronics*, IEEE Service Center, U.S., Vol. 6, No. 3, May/June 2000, pages 504-510.
- Ledentsov N.N. et al., "Interconnection between gain spectrum and cavity mode in a quantum-dot vertical-cavity laser," *Semiconductor Science and Technology*, Institute of Physics, London, G.B., Vol. 14, No. 1, 1999, pages 99-102.
- Park, Gyoungwon et al., "Temperature Dependence of Gain Saturation in Multilevel Quantum Dot Lasers," *IEEE Journal of Quantum Electronics*, IEEE Inc., New York, U.S., Vol. 36, No. 9, September 2000, pages 1065-1071.
- Saito, Hideaki et al., "Controlling polarization of quantum-dot surface-emitting lasers by using structurally anisotropic self-assembled dots," *Applied Physics Letters*, American Institute of Physics, New York, U.S., Vol. 71, No. 5, August 4, 1997, pages 590-592.
- Schur, Richard et al., "Vertical Microcavity Lasers with InGaAs/GaAs Quantum Dots Formed by Spinodal Phase Separation," *Japanese Journal of Applied Physics*, Tokyo, Japan, Vol. 36, No. 3B, March 15, 1997, pages 357-360.
- Shchekin, Oleg B. et al., "Low-Threshold Continuous-Wave Two-Stack Quantum-Dot Laser with Reduced Temperature Sensitivity," *IEEE Photonics Technology Letters*, IEEE Inc., New York, U.S., Vol. 12, No. 9, September 2000, pages 1120-1122.
- Ustinov, V.M. et al., "High output power CW operation of a quantum dot laser," *Compound Semiconductors 1999*, Proceedings of the 26th International Symposium on Compound Semiconductors, Berlin, Germany, August 22-26, 1999, Institute of Physics Conference Series, IOP Publishing Ltd., London, G.B., No. 166, pages 277-280.
- PCT International Search Report, International Application No. PCT/US01/31256, May 27, 2003, 7 pages.
- PCT International Search Report, International Application No. PCT/US02/06221, May 27, 2003, 4 pages.
- Mehuys, D.; Mittelstein, M.; Yariv, A.; Sarfaty, R.; and Ungar, J.E.; *Optimised Fabry-Perot (AlGa)As Quantum-Well Lasers Tunable Over 105nm*; Electronic Letters; Vol. 25, No. 2; January 19, 1989; pp. 143-145.
- Mirin, R.; Gossard, A.; and Bowers, J.; *Room Temperature Lasing From InGaAs Quantum Dots*; Electronics Letters; Vol. 32, No. 18; August 29, 1996; pp.1732-1734.
- Morton, P.A.; Ackerman, D.A.; Shtengel, G.E.; Kazarinov, R.F.; Hybertsen, M.S.; Tanbun-Ek, T.; Logan, R.A.; and Sergent, A.M.; *Gain Characteristics Of 1.55 μ m High Speed Multiple-Quantum-Well Lasers*; IEEE Photonics Technology Letters, Vol. 7, No. 8; August 1995; pp. 833-835.

Mukai, K.; Nakata, Y.; Otsubo, K.; Sugawara, M.; Yokoyama, N.; and Ishikawa, H.; *High Characteristic Temperature Of Near-1.3 μm InGaAs/GaAs Quantum-Dot Lasers*; CLEO 2000 Conference; May 2000 pp. 345-346.

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Mukai, Kohki; Ohtsuka, Nobuyuki; Sugawara, Mitsuru; and Yamazaki; Susumu; *Self-Formed $\text{In}_{0.5}\text{Ga}_{0.5}\text{As}$ Quantum Dots On GaAs Substrates Emitting At 1.3 μm* ; Jpn. J. Appl. Phys. Vol. 33, Part 2, No. 12A; December 1, 1994; pp. 1710-1712.

Newell, T.C.; Bossert, D.J.; Stintz, A.; Fuchs, B.; Malloy, K.J.; and Lester, L.F.; *Gain And Linewidth Enhancement Factor In InAs Quantum-Dot Laser Diodes*; IEEE Photonics Technology Letters; Vol. 11, No. 12; December 1999; pp. 1527-1529.

Newell, T.C.; Li, H.; Eliseev, P.; Liu, G.T.; Stintz, A.; Malloy, K.J.; and Lester, L.F.; *Broadening Mechanisms, Gain, And Low Linewidth Enhancement Factor In InAs Quantum Dot Lasers*; Conference: CLEO 2000; May 2000; p. 363.

Newell, T.C.; Li, H.; Stintz, A.; Bossert, D.; Fuchs, B.; Malloy, K.J.; and Lester, L.F.; *Optical Characteristics And Low Linewidth Enhancement Factor in 1.2 μm Quantum Dot Lasers*; Conference: 1999 IEEE LEOS Annual Meeting Conference Proceedings; LEOS'99; 12th Annual Meeting; IEEE Lasers And Electro-Optics Society 1999 Annual Meeting; November 8-11, 1999.

Newell, T.C.; Varangis, P.; Pease, E.; Liu, G.T.; Stintz, A.; Malloy, K.; and Lester L.F.; *1.5 μm AlGaInAs Quantum Well Lasers Grown By The Digital Alloy Technique*; Conference: CLEO 2000; May 2000; pp. 174-175.

Nishi, Kenichi; Saito, Hideaki; and Sugou, Shigeo; *A Narrow Photoluminescence Linewidth of 21 meV at 1.35 μm From Strain-Reduced InAs Quantum Dots Covered By $\text{In}_{0.2}\text{Ga}_{0.8}\text{As}$ Grown On GaAs Substrates*; Applied Physics Letters; Vol. 74, No. 8; February 22, 1999; pp. 1111-1113.

Park, G.; Shchekin, O.B.; Huffaker, D.L.; and Deppe, D.G.; *Very Low Threshold Oxide-Confined 1.3 μm GaAs-Based Quantum Dot Laser*; CLEO 2000 Conference; May 2000; pp. 349-350.

- Park, Gyoungwon; Shchekin, Oleg B.; Csutak, Sebastian; Huffaker, Diana L.; and Deppe, Dennis G.; *Room-Temperature Continuous-Wave Operation Of A Single-Layered 1.3 μ m Quantum Dot Laser*; Applied Physics Letters, Vol. 75, No. 21; November 22, 1999; pp. 3267-3269.
- Prieto, J.A.; Armelles, G.; Priester, C.; Garcia, J.M.; Gonzalez, L.; and Garcia, R.; *Strain-Induced Optical Anisotropy In Self-Organized Quantum Structures At The E_1 Transition*; Applied Physics Letters; Vol. 76, No. 16; April 17, 2000; pp. 2197-2199.
- Qiu, Y.; Gogna, P.; Forouhar, S.; Stintz, A.; and Lester, L.F.; *High-Performance InAs Quantum Dot Lasers Near 1.3 μ m*; Applied Physics Letters; Vol. 79, Number 22; November 26, 2001; pp. 3570-3572.
- Qiu, Y.; Gogna, P.; and Forouhar, S.; *High Temperature Continuous Wave Operation Of InAs Quantum Dot Lasers Near 1.3 μ m*; Conference: IEEE Lasers & Electro-Optics Society; LEOS Conference; November 12-16, 2001; pp. 267-268.
- Sakaki, Hiroyuki; *Quantum Wires, Quantum Boxes And Related Structures; Physics, Device Potentials And Structural Requirements*; Surface Science; Vol. 267; 1992; pp.623-629.
- Shernyakov, Yu.M.; Bedarev, D.A.; Kondrat'eva, E.Yu.; Kop'ev, P.S.; Kovsh; A.R.; Maleev, N.A.; Maximov, M.V.; Mikhrin, S.S.; Tsatsul'nikov, A.F.; Ustinov, V.M.; Volovik, B.V.; Zhukov, A.E.; Alferov, Zh.I.; Ledentsov, N.N.; and Bimberg, D.; *1.3 μ m GaAs-Based Laser Using Quantum Dots Obtained By Activated Spinodal Decomposition*; Electronics Letters; Vol. 35, No. 11; May 27, 1999; pp. 898-900.
- Shoji, H.; Mukai, K.; Ohtsuka, N.; Sugawara, M.; Uchida, T.; and Ishikawa, H.; *Lasing At Three-Dimensionally Quantum-Confined Sublevel Of Self-Organized In_{0.5}Ga_{0.5}As Quantum Dots By Current Injection*; IEEE Photonics Technology Letters, Vol. 7, No. 12; December 1995; pp. 1385-1387.
- Stintz, A.; Liu, G.T.; Gray, A.L.; Spillers, R.; Delgado, S.M.; and Malloy, K.J.; *Characterization Of InAs Quantum Dots In Strained In_xGa_{1-x}As Quantum Wells*; J.Vac.Sci.Technol.; Vol. B 18(3); May/Jun 2000; pp.1496-1501.
- Stintz, A.; Liu, G.T.; Li, H.; Lester, L.F.; and Malloy, K.J.; *Low-Threshold Current Density 1.3- μ m InAs Quantum-Dot Lasers With The Dots-In-A-Well (DWELL) Structure*; IEEE Photonics Technology Letters; Vol. 12, No. 6; June 2000; pp. 591-593.
- Tabuchi, H.; and Ishikawa H.; *External Grating Tunable MQW Laser With Wide Tuning Range Of 240nm*; Electronic Letters; Vol. 26, No. 11; May 24, 1990; pp. 742-743.
- Thomson, J.D.; Herrmann, E.; Summers, H.D.; Smowton, P.M.; and Hopkinson, M.; *Temperature Insensitive Quantum Dot Structures For Vertical Cavity Lasers*; CLEO 2000 Conference; May 2000; pp. 347-348.

Ustinov, V.M.; Maleev, N.A.; Zhukov, A.E.; Kovsh, A.R.; Egorov, A.Yu.; Lunev, A.V.; Volovik, B.V.; Krestnikov, I.L.; Musikhin, Yu.G.; Bert, N.A.; Kop'ev, P.S.; and Alferov, Zh.I.; *InAs/InGaAs Quantum Dot Structures On GaAs Substrates Emitting at 1.3 μ m*; Applied Physics Letters; Vol. 74, No. 19; May 10, 1999; pp. 2815-2817.

Varangis, P.M.; Li, H.; Liu, G.T.; Newell, T.C.; Stintz, A.; Fuchs, B.; Malloy, K.J.; and Lester, L.F.; *Low-Threshold Quantum Dot Lasers With 201nm Tuning Range*; Electronics Letters; Vol. 36, No. 18; August 31, 2000.

Varangis, P.M.; Li, H.; Liu, G.T.; Newell, T.C.; Stintz, A.; Fuchs, B.; Malloy, K.J.; and Lester, L.F.; *183 nm Tuning Range In A Grating-Coupled External-Cavity Quantum Dot Laser*; IEEE 2000 International Semiconductor Laser Conference; pp. 137-138.

Wang, R.H.; Stintz, A.; Rotter, T.J.; Malloy, K.J.; and Lester, L.F.; *Low Threshold Oxide-Confined InAs Quantum Dash Ridge Waveguide Lasers On InP Substrates*; Conference: IEEE Lasers & Electro-Optics Society; LEOS Conference; November 12-16, 2001; pp. 405-406.

Wang, R.H.; Stintz, A.; Varangis, P.M.; Newell, T.C.; Li, H.; Malloy, K.J.; and Lester, L.F.; *Room-Temperature Operation Of InAs Quantum-Dash Lasers On InP (001)*; IEEE Photonics Technology Letters; Vol. 13, No. 8; August 2001; pp. 767-769.

Wang, Ronghua; Stintz, A.; Varangis, P.M.; Newell, T.C.; Li, H.; Lester, L.F.; and Malloy, K.J.; *1.6 μ m Single And Multiple-Stack Room Temperature Quantum Dash Lasers On InP*; Conference: CLEO (Conference On Lasers And Electro Optics)/QELS Plenary Session And Awards Ceremony; May 9, 2001.

Wang, Zhanguo; Liu, Fengqi; Liang, Jiben; and Xu, Bo; *Self-Assembled InAs/GaAs Quantum Dots And Quantum Dot Laser*; Science in China; Vol. 43, No. 8; August 2000; pp. 861-870.

Wasilewski, Z.R.; Fafard, S.; and McCaffrey J.P.; *Size And Shape Engineering Of Vertically Stacked Self-Assembled Quantum Dots*; Journal Of Crystal Growth; Vol. 201, 202; 1999; pp. 1131-1135.

Willatzen, M.; Tanaka, T.; Arakawa, Y.; and Singh, J.; *Polarization Dependence Of Optoelectronic Properties In Quantum Dots And Quantum Wires – Consequences Of Valence-Band Mixing*; IEEE Journal of Quantum Electronics; Vol. 30, No. 3; March 1994; pp. 640-653.

Zhukov, A.E.; Kovsh, A.R.; Egorov, A.Yu.; Maleev, N.A.; Ustinov, V.M.; Volovik, B.V.; Maksimov, M.V.; Tsatsul'nikov, A.F.; Ledenstov, N.N.; Shernyakov, Yu.M.; Lunev, A.V.; Musikhin, Yu.G.; Bert, N.A.; Kop'ev, P.S.; and Alferov, Zh.I.; *Photo And Electoluminescence In The 1.3 μ m Wavelength Range From Quantum-Dot Structures Grown On GaAs Substrates*; Semiconductors; Vol. 33, No. 2; February 1999; pp. 153-156.

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These references appeared in Information Disclosure Statements initialed by the Examiner on 02/03/2004 and attached to the Notice of Allowance dated 02/18/2004, copies of which are attached hereto as Exhibit A. All of these errors are typographical errors.

Please send the Certificate to:
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Respectfully submitted,
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Dated: Sept. 27, 2004

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UNITED STATES PATENT AND TRADEMARK OFFICE
CERTIFICATE OF CORRECTION

PATENT NO. : 6,782,021 ~~B2~~
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INVENTOR(S) : Xiaodong Huang, Andreas Stintz, Kevin Malloy, Guangtian Liu, Luke Lester
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UNITED STATES PATENT AND TRADEMARK OFFICE
CERTIFICATE OF CORRECTION

PATENT NO. : 6,782,021 *B2*

DATED : August 24, 2004

INVENTOR(S) : Xiaodong Huang, Andreas Stintz, Kevin Malloy, Guangtian Liu, Luke Lester
and Julian Cheng

It is certified that error appears in the above-identified patent and that said Letters Patent is hereby corrected as shown below:

Title Page, OTHER PUBLICATIONS (cont.):

Prieto, J.A.; Armelles, G.; Priester, C.; Garcia, J.M.; Gonzalez, L.; and Garcia, R.; *Strain-Induced Optical Anisotropy In Self-Organized Quantum Structures At The E_1 Transition*; Applied Physics Letters; Vol. 76, No. 16; April 17, 2000; pp. 2197-2199.

Qiu, Y.; Gogna, P.; Forouhar, S.; Stintz, A.; and Lester, L.F.; *High-Performance InAs Quantum Dot Lasers Near 1.3 μm* ; Applied Physics Letters; Vol. 79, Number 22; November 26, 2001; pp. 3570-3572.

Qiu, Y.; Gogna, P.; and Forouhar, S.; *High Temperature Continuous Wave Operation Of InAs Quantum Dot Lasers Near 1.3 μm* ; Conference: IEEE Lasers & Electro-Optics Society; LEOS Conference; November 12-16, 2001; pp. 267-268.

Sakaki, Hiroyuki; *Quantum Wires, Quantum Boxes And Related Structures; Physics, Device Potentials And Structural Requirements*; Surface Science; Vol. 267; 1992; pp.623-629.

Shernyakov, Yu.M.; Bedarev, D.A.; Kondrat'eva, E.Yu.; Kop'ev, P.S.; Kovsh; A.R.; Maleev, N.A.; Maximov, M.V.; Mikhlin, S.S.; Tsatsul'nikov, A.F.; Ustinov, V.M.; Volovik, B.V.; Zhukov, A.E.; Alferov, Zh.I.; Ledentsov, N.N.; and Bimberg, D.; *1.3 μm GaAs-Based Laser Using Quantum Dots Obtained By Activated Spinodal Decomposition*; Electronics Letters; Vol. 35, No. 11; May 27, 1999; pp. 898-900.

Shoji, H.; Mukai, K.; Ohtsuka, N.; Sugawara, M.; Uchida, T.; and Ishikawa, H.; *Lasing At Three-Dimensionally Quantum-Confined Sublevel Of Self-Organized $\text{In}_{0.5}\text{Ga}_{0.5}\text{As}$ Quantum Dots By Current Injection*; IEEE Photonics Technology Letters, Vol. 7, No. 12; December 1995; pp. 1385-1387.

MAILING ADDRESS OF SENDER:

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801 California Street
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Stintz, A.; Liu, G.T.; Li, H.; Lester, L.F.; and Malloy, K.J.; *Low-Threshold Current Density 1.3- μ m InAs Quantum-Dot Lasers With The Dots-In-A-Well (DWELL) Structure*; IEEE Photonics Technology Letters; Vol. 12, No. 6; June 2000; pp. 591-593.

Tabuchi, H.; and Ishikawa H.; *External Grating Tunable MQW Laser With Wide Tuning Range Of 240nm*; Electronic Letters; Vol. 26, No. 11; May 24, 1990; pp. 742-743.

Thomson, J.D.; Herrmann, E.; Summers, H.D.; Smowton, P.M.; and Hopkinson, M.; *Temperature Insensitive Quantum Dot Structures For Vertical Cavity Lasers*; CLEO 2000 Conference; May 2000; pp. 347-348.

Ustinov, V.M.; Maleev, N.A.; Zhukov, A.E.; Kovsh, A.R.; Egorov, A.Yu.; Lunev, A.V.; Volovik, B.V.; Krestnikov, I.L.; Musikhin, Yu.G.; Bert, N.A.; Kop'ev, P.S.; and Alferov, Zh.I.; *InAs/InGaAs Quantum Dot Structures On GaAs Substrates Emitting at 1.3 μ m*; Applied Physics Letters; Vol. 74, No. 19; May 10, 1999; pp. 2815-2817.

Varangis, P.M.; Li, H.; Liu, G.T.; Newell, T.C.; Stintz, A.; Fuchs, B.; Malloy, K.J.; and Lester, L.F.; *Low-Threshold Quantum Dot Lasers With 201nm Tuning Range*; Electronics Letters; Vol. 36, No. 18; August 31, 2000.

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Title Page, OTHER PUBLICATIONS (cont.):

Varangis, P.M.; Li, H.; Liu, G.T.; Newell, T.C.; Stintz, A.; Fuchs, B.; Malloy, K.J.; and Lester, L.F.; *183 nm Tuning Range In A Grating-Coupled External-Cavity Quantum Dot Laser*; IEEE 2000 International Semiconductor Laser Conference; pp. 137-138.

Wang, R.H.; Stintz, A.; Rotter, T.J.; Malloy, K.J.; and Lester, L.F.; *Low Threshold Oxide-Confined InAs Quantum Dash Ridge Waveguide Lasers On InP Substrates*; Conference: IEEE Lasers & Electro-Optics Society; LEOS Conference; November 12-16, 2001; pp. 405-406.

Wang, R.H.; Stintz, A.; Varangis, P.M.; Newell, T.C.; Li, H.; Malloy, K.J.; and Lester, L.F.; *Room-Temperature Operation Of InAs Quantum-Dash Lasers On InP (001)*; IEEE Photonics Technology Letters; Vol. 13, No. 8; August 2001; pp. 767-769.

Wang, Ronghua; Stintz, A.; Varangis, P.M.; Newell, T.C.; Li, H.; Lester, L.F.; and Malloy, K.J.; *1.6 μ m Single And Multiple-Stack Room Temperature Quantum Dash Lasers On InP*; Conference: CLEO (Conference On Lasers And Electro Optics)/QELS Plenary Session And Awards Ceremony; May 9, 2001.

Wang, Zhanguo; Liu, Fengqi; Liang, Jiben; and Xu, Bo; *Self-Assembled InAs/GaAs Quantum Dots And Quantum Dot Laser*; Science in China; Vol. 43, No. 8; August 2000; pp. 861-870.

Wasilewski, Z.R.; Fafard, S.; and McCaffrey J.P.; *Size And Shape Engineering Of Vertically Stacked Self-Assembled Quantum Dots*; Journal Of Crystal Growth; Vol. 201, 202; 1999; pp. 1131-1135.

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It is certified that error appears in the above-identified patent and that said Letters Patent is hereby corrected as shown below:

Title Page, OTHER PUBLICATIONS (cont.):

Willatzen, M.; Tanaka, T.; Arakawa, Y.; and Singh, J.; *Polarization Dependence Of Optoelectronic Properties In Quantum Dots And Quantum Wires – Consequences Of Valence-Band Mixing*; IEEE Journal of Quantum Eletronics; Vol. 30, No. 3; March 1994; pp. 640-653.

Zhukov, A.E.; Kovsh, A.R.; Egorov, A.Yu.; Maleev, N.A., Ustinov, V.M.; Volovik, B.V.; Maksimov, M.V.; Tsatsul'nikov, A.F.; Ledenstov, N.N.; Shernyakov, Yu.M.; Lunev, A.V., Musikhin, Yu.G.; Bert, N.A.; Kop'ev, P.S.; and Alferov, Zh.I.; *Photo And Electoluminescence In The 1.3 μ m Wavelength Range From Quantum-Dot Structures Grown On GaAs Substrates*; Semiconductors; Vol. 33, No. 2; February 1999; pp. 153-156.

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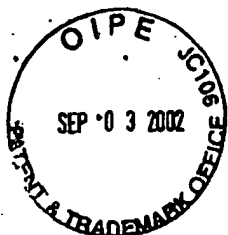
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FORM PTO-1449 (REV. 6-89)		U.S. DEPARTMENT OF COMMERCE Patent and Trademark Office		Attorney's Docket No. 22920-06460	Serial No. 10/087,408
INFORMATION DISCLOSURE CITATION (Use several sheets if necessary)				Applicant Xiaodong Huang et al.	
				Filing Date March 1, 2002	Group Art Unit Unassigned
OTHER DOCUMENTS (Including Author, Title, Date, Pertinent Pages, Etc.)					
JD	80	Varangis, P.M.; Li, H.; Liu, G.T.; Newell, T.C.; Stintz, A.; Fuchs, B.; Malloy, K.J.; and Lester, L.F.; <i>183 nm Tuning Range In A Grating-Coupled External-Cavity Quantum Dot Laser</i> ; IEEE 2000 International Semiconductor Laser Conference; pp. 137-138.			
JD	81	Wang, R.H.; Stintz, A.; Rotter, T.J.; Malloy, K.J.; and Lester, L.F.; <i>Low Threshold Oxide-Confined InAs Quantum Dash Ridge Waveguide Lasers On InP Substrates</i> ; Conference: IEEE Lasers & Electro-Optics Society; LEOS Conference; November 12-16, 2001; pp. 405-406.			
JD	82	Wang, R.H.; Stintz, A.; Varangis, P.M.; Newell, T.C.; Li, H.; Malloy, K.J.; and Lester, L.F.; <i>Room-Temperature Operation Of InAs Quantum-Dash Lasers On InP (001)</i> ; IEEE Photonics Technology Letters; Vol. 13, No. 8; August 2001; pp. 767-769.			
JD	83	Wang, Ronghua; Stintz, A.; Varangis, P.M.; Newell, T.C.; Li, H.; Lester, L.F.; and Malloy, K.J.; <i>1.6 μm Single And Multiple-Stack Room Temperature Quantum Dash Lasers On InP</i> ; Conference: CLEO (Conference On Lasers And Electro Optics)/QELS Plenary Session And Awards Ceremony; May 9, 2001.			
JD	84	Wang, Zhanguo; Liu, Fengqi; Liang, Jiben; and Xu, Bo; <i>Self-Assembled InAs/GaAs Quantum Dots And Quantum Dot Laser</i> ; Science in China; Vol. 43, No. 8; August 2000; pp. 861-870.			
JD	85	Wasilewski, Z.R.; Fafard, S.; and McCaffrey J.P.; <i>Size And Shape Engineering Of Vertically Stacked Self-Assembled Quantum Dots</i> ; Journal Of Crystal Growth; Vol. 201, 202; 1999; pp. 1131-1135.			
JD	86	Willatzen, M.; Tanaka, T.; Arakawa, Y.; and Singh, J.; <i>Polarization Dependence Of Optoelectronic Properties In Quantum Dots And Quantum Wires - Consequences Of Valence-Band Mixing</i> ; IEEE Journal of Quantum Electronics; Vol. 30, No. 3; March 1994; pp. 640-653.			
JD	87	Zhukov, A.E.; Kovsh, A.R.; Egorov, A.Yu.; Maleev, N.A.; Ustinov, V.M.; Volovik, B.V.; Maksimov, M.V.; Tsatsul'nikov, A.F.; Ledenstov, N.N.; Shernyakov, Yu.M.; Lunev, A.V.; Musikhin, Yu.G.; Bert, N.A.; Kop'ev, P.S.; and Alferov, Zh.I.; <i>Photo And Electoluminescence In The 1.3 μm Wavelength Range From Quantum-Dot Structures Grown On GaAs Substrates</i> ; Semiconductors; Vol. 33, No. 2; February 1999; pp. 153-156.			
EXAMINER		DATE CONSIDERED 2/02/04			
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Exhibit A



Sheet 6 of 7

FORM PTO-1449 (REV. 6-89) INFORMATION DISCLOSURE CITATION (Use several sheets if necessary)	U.S. DEPARTMENT OF COMMERCE Patent and Trademark Office	Attorney's Docket No. 22920-06460	Serial No. 10/087,408
		Applicant Xiaodong Huang et al.	
		Filing Date March 1, 2002	Group Art Unit Unassigned

OTHER DOCUMENTS (Including Author, Title, Date, Pertinent Pages, Etc.)

JD	67	Park, Gyouunwon; Shchekin, Oleg B.; Csutak, Sebastian; Huffaker, Diana L.; and Deppe, Dennis G.; <i>Room-Temperature Continuous-Wave Operation Of A Single-Layered 1.3μm Quantum Dot Laser</i> ; Applied Physics Letters, Vol. 75, No. 21; November 22, 1999; pp. 3267-3269.
JD	68	Prieto, J.A.; Armelles, G.; Priester, C.; Garcia, J.M.; Gonzalez, L.; and Garcia, R.; <i>Strain-Induced Optical Anisotropy In Self-Organized Quantum Structures At The E_c Transition</i> ; Applied Physics Letters; Vol. 76, No. 16; April 17, 2000; pp. 2197-2199.
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JD	70	Qiu, Y.; Gogna, P.; and Forouhar, S.; <i>High Temperature Continuous Wave Operation Of InAs Quantum Dot Lasers Near 1.3 μm</i> ; Conference: IEEE Lasers & Electro-Optics Society; LEOS Conference; November 12-16, 2001; pp. 267-268.
JD	71	Sakaki, Hiroyuki; <i>Quantum Wires, Quantum Boxes And Related Structures; Physics, Device Potentials And Structural Requirements</i> ; Surface Science; Vol. 267; 1992; pp.623-629.
JD	72	Shernyakov, Yu.M.; Bedarev, D.A.; Kondrat'eva, E.Yu.; Kop'ev, P.S.; Kovsh; A.R.; Maleev, N.A.; Maximov, M.V.; Mikhlin, S.S.; Tsatsul'nikov, A.F.; Ustinov, V.M.; Volovik, B.V.; Zhukov, A.E.; Alferov, Zh.I.; Ledentsov, N.N.; and Bimberg, D.; <i>1.3μm GaAs-Based Laser Using Quantum Dots Obtained By Activated Spinodal Decomposition</i> ; Electronics Letters; Vol. 35, No. 11; May 27, 1999; pp. 898-900.
JD	73	Shoji, H.; Mukai, K.; Ohtsuka, N.; Sugawara, M.; Uchida, T.; and Ishikawa, H.; <i>Lasing At Three-Dimensionally Quantum-Confined Sublevel Of Self-Organized In_{0.5}Ga_{0.5}As Quantum Dots By Current Injection</i> ; IEEE Photonics Technology Letters, Vol. 7, No. 12; December 1995; pp. 1385-1387.
JD	74	Stintz, A.; Liu, G.T.; Gray, A.L.; Spillers, R.; Delgado, S.M.; and Malloy, K.J.; <i>Characterization Of InAs Quantum Dots In Strained In_xGa_{1-x}As Quantum Wells</i> ; J.Vac.Sci.Technol.; Vol. B 18(3); May/Jun 2000; pp.1496-1501.
JD	75	Stintz, A.; Liu, G.T.; Li, H.; Lester, L.F.; and Malloy, K.J.; <i>Low-Threshold Current Density 1.3-μm InAs Quantum-Dot Lasers With The Dots-In-A-Well (DWELL) Structure</i> ; IEEE Photonics Technology Letters; Vol. 12, No. 6; June 2000; pp. 591-593.
JD	76	Tabuchi, H.; and Ishikawa H.; <i>External Grating Tunable MQW Laser With Wide Tuning Range Of 240nm</i> ; Electronic Letters; Vol. 26, No. 11; May 24, 1990; pp. 742-743.
JD	77	Thomson, J.D.; Herrmann, E.; Summers, H.D.; Smowton, P.M.; and Hopkinson, M.; <i>Temperature Insensitive Quantum Dot Structures For Vertical Cavity Lasers</i> ; CLEO 2000 Conference; May 2000; pp. 347-348.
JD	78	Ustinov, V.M.; Maleev, N.A.; Zhukov, A.E.; Kovsh, A.R.; Egorov, A.Yu.; Lunev, A.V.; Volovik, B.V.; Krestnikov, I.L.; Musikhin, Yu.G.; Bert, N.A.; Kop'ev, P.S.; and Alferov, Zh.I.; <i>InAs/InGaAs Quantum Dot Structures On GaAs Substrates Emitting at 1.3μm</i> ; Applied Physics Letters; Vol. 74, No. 19; May 10, 1999; pp. 2815-2817.
JD	79	Varangis, P.M.; Li, H.; Liu, G.T.; Newell, T.C.; Stintz, A.; Fuchs, B.; Malloy, K.J.; and Lester, L.F.; <i>Low-Threshold Quantum Dot Lasers With 201nm Tuning Range</i> ; Electronics Letters; Vol. 36, No. 18; August 31, 2000.

EXAMINER James P. Davis	DATE CONSIDERED 2/07/04
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Sheet 5 of 7

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INFORMATION DISCLOSURE CITATION (Use several sheets if necessary)		Applicant Xiaodong Huang et al.	
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OTHER DOCUMENTS (Including Author, Title, Date, Pertinent Pages, Etc.)

- | | |
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| 54 | Mehuys, D.; Mittelstein, M.; Yariv, A.; Sarfaty, R.; and Ungar, J.E.; <i>Optimised Fabry-Perot (AlGa)As Quantum-Well Lasers Tunable Over 105nm</i> ; Electronic Letters; Vol. 25, No. 2; January 19, 1989; pp. 143-145. |
| 55 | Mirin, R.; Gossard, A.; and Bowers, J.; <i>Room Temperature Lasing From InGaAs Quantum Dots</i> ; Electronics Letters; Vol. 32, No. 18; August 29, 1996; pp. 1732-1734. |
| 56 | Morton, P.A.; Ackerman, D.A.; Shtengel, G.E.; Kazarinov, R.F.; Hybertsen, M.S.; Tanbun-Ek, T.; Logan, R.A.; and Sergent, A.M.; <i>Gain Characteristics Of 1.55 μm High-Speed Multiple-Quantum-Well Lasers</i> ; IEEE Photonics Technology Letters, Vol. 7, No. 8; August 1995; pp. 833-835. |
| 57 | Mukai, K.; Nakata, Y.; Otsubo, K.; Sugawara, M.; Yokoyama, N.; and Ishikawa, H.; <i>High Characteristic Temperature Of Near-1.3 μm InGaAs/GaAs Quantum-Dot Lasers</i> ; CLEO 2000 Conference; May 2000 pp. 345-346. |
| 58 | Mukai, K.; Nakata, Y.; Shoji, H.; Sugawara, M.; Ohtsubo, K.; Yokoyama, N.; and Ishikawa, H.; <i>Lasing With Low Threshold Current And High Output Power From Columnar-Shaped InAs/GaAs Quantum Dots</i> ; Electronics Letters; Vol. 34, No. 16; August 6, 1998; pp. 1588-1590. |
| 59 | Mukai, Kohki; Ohtsuka, Nobuyuki; Shoji, Hajime; and Sugawara, Mitsuru; <i>Growth And Optical Evaluation Of InGaAs/GaAs Quantum Dots Self-Formed During Alternate Supply Of Precursors</i> ; Applied Surface Science; Vol. 112; March 1997; pp. 102-109. |
| 60 | Mukai, Kohki; Ohtsuka, Nobuyuki; Sugawara, Mitsuru; and Yamazaki, Susumu; <i>Self-Formed In_{0.5}Ga_{0.5}As Quantum Dots On GaAs Substrates Emitting At 1.3 μm</i> ; Jpn. J. Appl. Phys. Vol. 33, Part 2, No. 12A; December 1, 1994; pp. 1710-1712. |
| 61 | Newell, T.C.; Bossert, D.J.; Stintz, A.; Fuchs, B.; Malloy, K.J.; and Lester, L.F.; <i>Gain And Linewidth Enhancement Factor In InAs Quantum-Dot Laser Diodes</i> ; IEEE Photonics Technology Letters; Vol. 11, No. 12; December 1999; pp. 1527-1529. |
| 62 | Newell, T.C.; Li, H.; Eliseev, P.; Liu, G.T.; Stintz, A.; Malloy, K.J.; and Lester, L.F.; <i>Broadening Mechanisms, Gain, And Low Linewidth Enhancement Factor In InAs Quantum Dot Lasers</i> ; Conference: CLEO 2000; May 2000; p. 363. |
| 63 | Newell, T.C.; Li, H.; Stintz, A.; Bossert, D.; Fuchs, B.; Malloy, K.J.; and Lester, L.F.; <i>Optical Characteristics And Low Linewidth Enhancement Factor in 1.2 μm Quantum Dot Lasers</i> ; Conference: 1999 IEEE LEOS Annual Meeting Conference Proceedings; LEOS'99; 12 th Annual Meeting; IEEE Lasers And Electro-Optics Society 1999 Annual Meeting; November 8-11, 1999. |
| 64 | Newell, T.C.; Varangis, P.; Pease, E.; Liu, G.T.; Stintz, A.; Malloy, K.; and Lester L.F.; <i>1.5 μm AlGaInAs Quantum Well Lasers Grown By The Digital Alloy Technique</i> ; Conference: CLEO 2000; May 2000; pp. 174-175. |
| 65 | Nishi, Kenichi; Saito, Hideaki; and Sugou, Shigeo; <i>A Narrow Photoluminescence Linewidth of 21 meV at 1.35 μm From Strain-Reduced InAs Quantum Dots Covered By In_{0.2}Ga_{0.8}As Grown On GaAs Substrates</i> ; Applied Physics Letters; Vol. 74, No. 8; February 22, 1999; pp. 1111-1113. |
| 66 | Park, G.; Shchekin, O.B.; Huffaker, D.L.; and Deppe, D.G.; <i>Very Low Threshold Oxide-Confined 1.3 μm GaAs-Based Quantum Dot Laser</i> ; CLEO 2000 Conference; May 2000; pp. 349-350. |

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT				Application No.	10/087,408
				Filing Date	March 1, 2002
				First Named Inventor	Xiaodong Huang
				Art Unit	2828
				Examiner Name	James W. Davie
Sheet	2	of	2	Attorney Docket Number	22920-06460

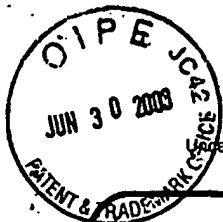
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JD	8	Park, Gyoungwon et al., "Temperature Dependence of Gain Saturation in Multilevel Quantum Dot Lasers," <i>IEEE Journal of Quantum Electronics</i> , IEEE Inc., New York, U.S., Vol. 36, No. 9, September 2000, pages 1065-1071.		
JD	9	Saito, Hideaki et al., "Controlling polarization of quantum-dot surface-emitting lasers by using structurally anisotropic self-assembled dots," <i>Applied Physics Letters</i> , American Institute of Physics, New York, U.S., Vol. 71, No. 5, August 4, 1997, pages 590-592.		
JD	10	Schur, Richard et al., "Vertical Microcavity Lasers with InGaAs/GaAs Quantum Dots Formed by Spinodal Phase Separation," <i>Japanese Journal of Applied Physics</i> , Tokyo, Japan, Vol. 36, No. 3B, March 15, 1997, pages 357-360.		
JD	11	Shchekin, Oleg B. et al., "Low-Threshold Continuous-Wave Two-Stack Quantum-Dot Laser with Reduced Temperature Sensitivity," <i>IEEE Photonics Technology Letters</i> , IEEE Inc., New York, U.S., Vol. 12, No. 9, September 2000, pages 1120-1122.		
JD	12	Ustinov, V.M. et al., "High output power CW operation of a quantum dot laser," <i>Compound Semiconductors 1999</i> , Proceedings of the 26 th International Symposium on Compound Semiconductors, Berlin, Germany, August 22-26, 1999, Institute of Physics Conference Series, IOP Publishing Ltd., London, G.B., No. 166, pages 277-280.		
JD	13	PCT International Search Report, International Application No. PCT/US01/31256, May 27, 2003, 7 pages.		
JD	14	PCT International Search Report, International Application No. PCT/US02/06221, May 27, 2003, 4 pages.		

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**INFORMATION DISCLOSURE
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Application No.	10/087,408
Filing Date	March 1, 2002
First Named Inventor	Xiaodong Huang
Art Unit	2828
Examiner Name	James W. Davie
Attorney Docket Number	22920-06460

Sheet	1	of	1
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U.S. PATENT DOCUMENTS

Examiner Initials*	Cite No. ¹	Document No. Number - Kind Code ² (if known)	Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document
JD	1	US-5,608,229 A	03-04-1997	Mukai et al.

FOREIGN PATENT DOCUMENTS

Examiner Initials*	Cite No. ¹	Foreign Patent Document Country Code ³ - Number ⁴ Kind Code ⁵ (if known)	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	T ⁶
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OTHER REFERENCES - NON-PATENT LITERATURE DOCUMENTS

Examiner Initials*	Cite No. ¹	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published	T ⁶
JD	2	Komori, Kazuhiro et al., "Noise Study of Low-Dimensional Quantum-Well Semiconductor Laser Amplifiers," <i>IEEE Journal of Quantum Electronics</i> , IEEE Inc., New York, US, Vol. 28, No. 9, September 1, 1992, pages 1894-1900.	
JD	3	Saito, Hideaki et al., "Room-temperature lasing operation of a Quantum-dot vertical-cavity surface-emitting laser," <i>Applied Physics Letters</i> , American Institute of Physics, New York, US, Vol. 69, No. 21, November 18, 1996, pages 3140-3142.	
JD	4	Utzmeier, T. et al., "Growth and characterization of self-organized InSb quantum dots and quantum dashes," <i>Journal of Crystal Growth</i> , North-Holland Publishing Co., Amsterdam, The Netherlands, Vol. 175-176, May 1, 1997, pages 725-729.	
JD	5	PCT International Search Report, International Application No. PCT/US01/29561, June 6, 2003, 7 pages.	

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22920/06460/DOCS/1359230.1

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CERTIFICATE OF CORRECTION

PATENT NO. : 6,782,021

DATED : August 24, 2004

INVENTOR(S) : Xiaodong Huang, Andreas Stintz, Kevin Malloy, Guangtian Liu, Luke Lester
and Julian Cheng

It is certified that error appears in the above-identified patent and that said Letters
Patent is hereby corrected as shown below:

Title Page,

Item [56], **References Cited**, U.S. PATENT DOCUMENTS, add:

--	5,608,229 A	03/1997	Mukai et al.	257 /14
	5,781,575 A	07/1998	Nilsson	372 /50
	5,930,278 A	07/1999	Menigaux	372 /50--

OTHER PUBLICATIONS, add:

-- Komori, Kazuhiro et al., "Noise Study of Low-Dimensional Quantum-Well
Semiconductor Laser Amplifiers," *IEEE Journal of Quantum Electronics*, IEEE
Inc., New York, US, Vol. 28, No. 9, September 1, 1992, pages 1894-1900.

Saito, Hideaki et al., "Room-temperature lasing operation of a Quantum-dot
vertical-cavity surface-emitting laser," *Applied Physics Letters*, " American
Institute of Physics, New York, US, Vol. 69, No. 21, November 18, 1996, pages
3140-3142.

Utzmeier, T. et al., "Growth and characterization of self-organized InSb
quantum dots and quantum dashes," *Journal of Crystal Growth*, North-Holland
Publishing Co., Amsterdam, The Netherlands, Vol. 175-176, May 1, 1997,
pages 725-729.

PCT International Search Report, International Application No.
PCT/US01/29561, June 6, 2003, 7 pages.

Bloch, J. et al., "Room-temperature 1.3 μm emission from InAs quantum dots
grown by metal organic chemical vapor deposition," *Applied Physics Letters*,
American Institute of Physics, New York, U.S., Vol. 75, No. 15, October 11,
1999, pages 2199-2201.

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Title Page, OTHER PUBLICATIONS (cont.):

Evans, P.W. et al., "Edge-emitting quantum well heterostructure laser diodes with auxiliary native-oxide vertical cavity confinement," *Applied Physics Letters*, American Institute of Physics, New York, U.S., Vol. 67, No. 21, November 20, 1995, pages 3168-3170.

Garcia, J.M. et al., "Electronic states tuning of InAs self-assembled quantum dots," *Applied Physics Letters*, American Institute of Physics, New York, U.S., Vol. 72, No. 24, June 15, 1998, pages 3172-3174.

Kim, Jin K. et al., "Lateral Carrier Confinement in Miniature Lasers Using Quantum Dots," *IEEE Journal of Selected Topics in Quantum Electronics*, IEEE Service Center, U.S., Vol. 6, No. 3, May/June 2000, pages 504-510.

Ledentsov N.N. et al., "Interconnection between gain spectrum and cavity mode in a quantum-dot vertical-cavity laser," *Semiconductor Science and Technology*, Institute of Physics, London, G.B., Vol. 14, No. 1, 1999, pages 99-102.

Park, Gyoungwon et al., "Temperature Dependence of Gain Saturation in Multilevel Quantum Dot Lasers," *IEEE Journal of Quantum Electronics*, IEEE Inc., New York, U.S., Vol. 36, No. 9, September 2000, pages 1065-1071.

Saito, Hideaki et al., "Controlling polarization of quantum-dot surface-emitting lasers by using structurally anisotropic self-assembled dots," *Applied Physics Letters*, American Institute of Physics, New York, U.S., Vol. 71, No. 5, August 4, 1997, pages 590-592.

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Title Page, OTHER PUBLICATIONS (cont.):

Schur, Richard et al., "Vertical Microcavity Lasers with InGaAs/GaAs Quantum Dots Formed by Spinodal Phase Separation," *Japanese Journal of Applied Physics*, Tokyo, Japan, Vol. 36, No. 3B, March 15, 1997, pages 357-360.

Shchekin, Oleg B. et al., "Low-Threshold Continuous-Wave Two-Stack Quantum-Dot Laser with Reduced Temperature Sensitivity," *IEEE Photonics Technology Letters*, IEEE Inc., New York, U.S., Vol. 12, No. 9, September 2000, pages 1120-1122.

Ustinov, V.M. et al., "High output power CW operation of a quantum dot laser," *Compound Semiconductors 1999*, Proceedings of the 26th International Symposium on Compound Semiconductors, Berlin, Germany, August 22-26, 1999, Institute of Physics Conference Series, IOP Publishing Ltd., London, G.B., No. 166, pages 277-280.

PCT International Search Report, International Application No. PCT/US01/31256, May 27, 2003, 7 pages.

PCT International Search Report, International Application No. PCT/US02/06221, May 27, 2003, 4 pages.

Mehuys, D.; Mittelstein, M.; Yariv, A.; Sarfaty, R.; and Ungar, J.E.; *Optimised Fabry-Perot (AlGa)As Quantum-Well Lasers Tunable Over 105nm*; Electronic Letters; Vol. 25, No. 2; January 19, 1989; pp. 143-145.

Mirin, R.; Gossard, A.; and Bowers, J.; *Room Temperature Lasing From InGaAs Quantum Dots*; Electronics Letters; Vol. 32, No. 18; August 29, 1996; pp.1732-1734.

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Title Page, OTHER PUBLICATIONS (cont.):

Morton, P.A.; Ackerman, D.A.; Shtengel, G.E.; Kazarinov, R.F.; Hybertsen, M.S.; Tanbun-Ek, T.; Logan, R.A.; and Sergeant, A.M.; *Gain Characteristics Of 1.55 μ m High Speed Multiple-Quantum-Well Lasers*; IEEE Photonics Technology Letters, Vol. 7, No. 8; August 1995; pp. 833-835.

Mukai, K.; Nakata, Y.; Otsubo, K.; Sugawara, M.; Yokoyama, N.; and Ishikawa, H.; *High Characteristic Temperature Of Near-1.3 μ m InGaAs/GaAs Quantum-Dot Lasers*; CLEO 2000 Conference; May 2000 pp. 345-346.

Mukai, K.; Nakata, Y.; Shoji, H.; Sugawara, M.; Ohtsubo, K.; Yokoyama, N.; and Ishikawa, H.; *Lasing With Low Threshold Current And High Output Power From Columnar-Shaped InAs/GaAs Quantum Dots*; Electronics Letters; Vol. 34, No. 16; August 6, 1998, pp. 1588-1590.

Mukai, Kohki; Ohtsuka, Nobuyuki; Shoji, Hajime; and Sugawara, Mitsuru; *Growth And Optical Evaluation Of InGaAs/GaAs Quantum Dots Self-Formed During Alternate Supply Of Precursors*; Applied Surface Science; Vol. 112; March 1997; pp. 102-109.

Mukai, Kohki; Ohtsuka, Nobuyuki; Sugawara, Mitsuru; and Yamazaki; Susumu; *Self-Formed In_{0.5}Ga_{0.5}As Quantum Dots On GaAs Substrates Emitting At 1.3 μ m*; Jpn. J. Appl. Phys. Vol. 33, Part 2, No. 12A; December 1, 1994; pp. 1710-1712.

Newell, T.C.; Bossert, D.J.; Stintz, A.; Fuchs, B.; Malloy, K.J.; and Lester, L.F.; *Gain And Linewidth Enhancement Factor In InAs Quantum-Dot Laser Diodes*; IEEE Photonics Technology Letters; Vol. 11, No. 12; December 1999; pp. 1527-1529.

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Title Page, OTHER PUBLICATIONS (cont.):

Newell, T.C.; Li, H.; Eliseev, P.; Liu, G.T.; Stintz, A.; Malloy, K.J.; and Lester, L.F.; *Broadening Mechanisms, Gain, And Low Linewidth Enhancement Factor In InAs Quantum Dot Lasers*; Conference: CLEO 2000; May 2000; p. 363.

Newell, T.C.; Li, H.; Stintz, A.; Bossert, D.; Fuchs, B.; Malloy, K.J.; and Lester, L.F.; *Optical Characteristics And Low Linewidth Enhancement Factor in 1.2 μm Quantum Dot Lasers*; Conference: 1999 IEEE LEOS Annual Meeting Conference Proceedings; LEOS'99; 12th Annual Meeting; IEEE Lasers And Electro-Optics Society 1999 Annual Meeting; November 8-11, 1999.

Newell, T.C.; Varangis, P.; Pease, E.; Liu, G.T.; Stintz, A.; Malloy, K.; and Lester L.F.; *1.5 μm AlGainAs Quantum Well Lasers Grown By The Digital Alloy Technique*; Conference: CLEO 2000; May 2000; pp. 174-175.

Nishi, Kenichi; Saito, Hideaki; and Sugou, Shigeo; *A Narrow Photoluminescence Linewidth of 21 meV at 1.35 μm From Strain-Reduced InAs Quantum Dots Covered By $\text{In}_{0.2}\text{Ga}_{0.8}\text{As}$ Grown On GaAs Substrates*; Applied Physics Letters; Vol. 74, No. 8; February 22, 1999; pp. 1111-1113.

Park, G.; Shchekin, O.B.; Huffaker, D.L.; and Deppe, D.G.; *Very Low Threshold Oxide-Confined 1.3 μm GaAs-Based Quantum Dot Laser*; CLEO 2000 Conference; May 2000; pp. 349-350.

Park, Gyoungwon; Shchekin, Oleg B.; Csutak, Sebastian; Huffaker, Diana L.; and Deppe, Dennis G.; *Room-Temperature Continuous-Wave Operation Of A Single-Layered 1.3 μm Quantum Dot Laser*; Applied Physics Letters, Vol. 75, No. 21; November 22, 1999; pp. 3267-3269.

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Title Page, OTHER PUBLICATIONS (cont.):

Prieto, J.A.; Armelles, G.; Priester, C.; Garcia, J.M.; Gonzalez, L.; and Garcia, R.; *Strain-Induced Optical Anisotropy In Self-Organized Quantum Structures At The E_1 Transition*; Applied Physics Letters; Vol. 76, No. 16; April 17, 2000; pp. 2197-2199.

Qiu, Y.; Gogna, P.; Forouhar, S.; Stintz, A.; and Lester, L.F.; *High-Performance InAs Quantum Dot Lasers Near 1.3 μm* ; Applied Physics Letters; Vol. 79, Number 22; November 26, 2001; pp. 3570-3572.

Qiu, Y.; Gogna, P.; and Forouhar, S.; *High Temperature Continuous Wave Operation Of InAs Quantum Dot Lasers Near 1.3 μm* ; Conference: IEEE Lasers & Electro-Optics Society; LEOS Conference; November 12-16, 2001; pp. 267-268.

Sakaki, Hiroyuki; *Quantum Wires, Quantum Boxes And Related Structures; Physics, Device Potentials And Structural Requirements*; Surface Science; Vol. 267; 1992; pp.623-629.

Shernyakov, Yu.M.; Bedarev, D.A.; Kondrat'eva, E.Yu.; Kop'ev, P.S.; Kovsh, A.R.; Maleev, N.A.; Maximov, M.V.; Mikhlin, S.S.; Tsatsul'nikov, A.F.; Ustinov, V.M.; Volovik, B.V.; Zhukov, A.E.; Alferov, Zh.I.; Ledentsov, N.N.; and Bimberg, D.; *1.3 μm GaAs-Based Laser Using Quantum Dots Obtained By Activated Spinodal Decomposition*; Electronics Letters; Vol. 35, No. 11; May 27, 1999; pp. 898-900.

Shoji, H.; Mukai, K.; Ohtsuka, N.; Sugawara, M.; Uchida, T.; and Ishikawa, H.; *Lasing At Three-Dimensionally Quantum-Confined Sublevel Of Self-Organized $\text{In}_{0.5}\text{Ga}_{0.5}\text{As}$ Quantum Dots By Current Injection*; IEEE Photonics Technology Letters, Vol. 7, No. 12; December 1995; pp. 1385-1387.

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Title Page, OTHER PUBLICATIONS (cont.):

Stintz, A.; Liu, G.T.; Gray, A.L.; Spillers, R.; Delgado, S.M.; and Malloy, K.J.; *Characterization Of InAs Quantum Dots In Strained In_xGa_{1-x}As Quantum Wells*; J.Vac.Sci.Technol.; Vol. B 18(3); May/Jun 2000; pp.1496-1501.

Stintz, A.; Liu, G.T.; Li, H.; Lester, L.F.; and Malloy, K.J.; *Low-Threshold Current Density 1.3-μm InAs Quantum-Dot Lasers With The Dots-In-A-Well (DWELL) Structure*; IEEE Photonics Technology Letters; Vol. 12, No. 6; June 2000; pp. 591-593.

Tabuchi, H.; and Ishikawa H.; *External Grating Tunable MQW Laser With Wide Tuning Range Of 240nm*; Electronic Letters; Vol. 26, No. 11; May 24, 1990; pp. 742-743.

Thomson, J.D.; Herrmann, E.; Summers, H.D.; Smowton, P.M.; and Hopkinson, M.; *Temperature Insensitive Quantum Dot Structures For Vertical Cavity Lasers*; CLEO 2000 Conference; May 2000; pp. 347-348.

Ustinov, V.M.; Maleev, N.A.; Zhukov, A.E.; Kovsh, A.R.; Egorov, A.Yu.; Lunev, A.V.; Volovik, B.V.; Krestnikov, I.L.; Musikhin, Yu.G.; Bert, N.A.; Kop'ev, P.S.; and Alferov, Zh.I.; *InAs/InGaAs Quantum Dot Structures On GaAs Substrates Emitting at 1.3μm*; Applied Physics Letters; Vol. 74, No. 19; May 10, 1999; pp. 2815-2817.

Varangis, P.M.; Li, H.; Liu, G.T.; Newell, T.C.; Stintz, A.; Fuchs, B.; Malloy, K.J.; and Lester, L.F.; *Low-Threshold Quantum Dot Lasers With 201nm Tuning Range*; Electronics Letters; Vol. 36, No. 18; August 31, 2000.

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Title Page, OTHER PUBLICATIONS (cont.):

Varangis, P.M.; Li, H.; Liu, G.T.; Newell, T.C.; Stintz, A.; Fuchs, B.; Malloy, K.J.; and Lester, L.F.; *183 nm Tuning Range In A Grating-Coupled External-Cavity Quantum Dot Laser*; IEEE 2000 International Semiconductor Laser Conference; pp. 137-138.

Wang, R.H.; Stintz, A.; Rotter, T.J.; Malloy, K.J.; and Lester, L.F.; *Low Threshold Oxide-Confined InAs Quantum Dash Ridge Waveguide Lasers On InP Substrates*; Conference: IEEE Lasers & Electro-Optics Society; LEOS Conference; November 12-16, 2001; pp. 405-406.

Wang, R.H.; Stintz, A.; Varangis, P.M.; Newell, T.C.; Li, H.; Malloy, K.J.; and Lester, L.F.; *Room-Temperature Operation Of InAs Quantum-Dash Lasers On InP (001)*; IEEE Photonics Technology Letters; Vol. 13, No. 8; August 2001; pp. 767-769.

Wang, Ronghua; Stintz, A.; Varangis, P.M.; Newell, T.C.; Li, H.; Lester, L.F.; and Malloy, K.J.; *1.6 μ m Single And Multiple-Stack Room Temperature Quantum Dash Lasers On InP*; Conference: CLEO (Conference On Lasers And Electro Optics)/QELS Plenary Session And Awards Ceremony; May 9, 2001.

Wang, Zhanguo; Liu, Fengqi; Liang, Jiben; and Xu, Bo; *Self-Assembled InAs/GaAs Quantum Dots And Quantum Dot Laser*; Science in China; Vol. 43, No. 8; August 2000; pp. 861-870.

Wasilewski, Z.R.; Fafard, S.; and McCaffrey J.P.; *Size And Shape Engineering Of Vertically Stacked Self-Assembled Quantum Dots*; Journal Of Crystal Growth; Vol. 201, 202; 1999; pp. 1131-1135.

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Title Page, OTHER PUBLICATIONS (cont.):

Willatzen, M.; Tanaka, T.; Arakawa, Y.; and Singh, J.; *Polarization Dependence Of Optoelectronic Properties In Quantum Dots And Quantum Wires – Consequences Of Valence-Band Mixing*; IEEE Journal of Quantum Eletronics; Vol. 30, No. 3; March 1994; pp. 640-653.

Zhukov, A.E.; Kovsh, A.R.; Egorov, A.Yu.; Maleev, N.A., Ustinov, V.M.; Volovik, B.V.; Maksimov, M.V.; Tsatsul'nikov, A.F.; Ledenstov, N.N.; Shernyakov, Yu.M.; Lunev, A.V., Musikhin, Yu.G.; Bert, N.A.; Kop'ev, P.S.; and Alferov, Zh.I.; *Photo And Electoluminescence In The 1.3 μ m Wavelength Range From Quantum-Dot Structures Grown On GaAs Substrates*; Semiconductors; Vol. 33, No. 2; February 1999; pp. 153-156.

--

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